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Standard Specification for
MORTAR AND GROUT FOR REINFORCED MASONRY[1]

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1. Scope

1.1 This specification covers mortar and grout for use in the construction of reinforced masonry structures.

2. Materials

2.1 Materials used as ingredients in the mortar and grout shall conform to the requirements specified in 2.1.1 to 2.1.8.

2.1.1 *Cementitious Materials*—Cementitious materials shall conform to one of the following specifications of the American Society for Testing and Materials:

2.1.1.1 *Portland Cement*—Type I, IA, II, IIA, III, and IIIA of Specification C 150, for Portland Cement.[2]

2.1.2.2 *Blended Cements*—Types IS, IS(MS), IS-A, IS-A(MS), IP, or IP-A of Specification C 595, for Blended Hydraulic Cements.[2]

2.1.1.3 *Masonry Cement*—Specification C 91, for Masonry Cement.[2]

2.1.1.4 *Quicklime*—Specification C 5, for Quicklime for Structural Purposes.[2]

2.1.1.5 *Hydrated Lime*—Type S of Specification C 207, for Hydrated Lime for Masonry Purposes.[2]

2.1.2 *Air-Entraining Admixtures*—Air-entraining admixtures shall conform to Specification C 260, for Air-Entraining Admixtures for Concrete.[3]

2.1.3 *Aggregates*—Aggregates shall conform to Specification C 144, for Aggregate for Masonry Mortar[4] or Specification C 404, for Aggregates for Masonry Grout.[4]

2.1.4 *Water*—Water shall be clean and potable.

2.1.5 *Admixtures*—Integral waterproofing compounds, accelerators, or other admixtures not definitely mentioned in the specification shall not be used in mortar or grout for use in reinforced masonry without approval in writing from the purchaser.

2.1.6 *Mortar Colors*—Only pure mineral oxide colors shall be used. The brand and quality of such coloring, and the amount to be used shall, unless definitely stipulated in the specification, be approved in writing by the purchaser.

2.1.7 *Antifreeze Compounds*—No antifreeze liquid, salts, or other substances shall be used in the mortar or grout to lower the freezing point.

2.1.8 *Storage of Materials*—Cementitious materials and aggregates shall be stored in such a manner as to prevent deterioration or intrusion of foreign material or moisture. Any material that has become unsuitable for good construction shall not be used.

3. Measurement and Mixing

3.1 *Measurement of Materials*—The method of measuring materials for the mortar used in construction shall be such that the

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[1] This specification is under the jurisdiction of ASTM Committee C-12 on Mortars for Unit Masonry and is the direct responsibility of Subcommittee C12.03 on Specifications for Mortar.

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[2] *1973 Annual Book of ASTM Standards*, Part 9.

[3] *1974 Annual Book of ASTM Standards*, Part 10.

[4] *1974 Annual Book of ASTM Standards*, Part 16.

specified proportions of the mortar materials can be controlled and accurately maintained.

NOTE 1—The weights per cubic foot of the materials are as follows:

Material	Weight, lb/ft^3 (kg/m^3)
Portland cement	94 (1504)
Masonry cement	weight printed on bag
Hydrated lime	40 (640)
Lime putty[a]	80 (1281)
Sand, damp and loose	80 (1281) of dry sand

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[a] All quicklime should be slaked according to the manufacturer's directions. All quicklime putty, except pulverized quicklime putty, should be sieved through a No. 20 (850-μm) sieve and allowed to cool until it has reached a temperature of 80 F (26.7 C). Quicklime putty should weigh at least 80 lb/ft^3. Putty that weighs less than this may be used in the proportion specifications if the required quantity of extra putty is added to meet the minimum weight requirements.

3.2 *Mixing Mortars*—All cementitious materials and aggregates shall be mixed for a minimum period of 5 min in a mechanical batch mixer (Note 2), with the amount of water required to produce the desired workability.

NOTE 2—Hand mixing of the mortar may be permitted on small jobs, with the written approval of the purchaser outlining the hand mixing procedure.

4. Mortar

4.1 Mortar shall consist of a mixture of cementitious material and aggregate conforming to the requirements specified in Section 2, to which sufficient water, and air-entraining admixture when required, have been added to bring the mixture to the desired consistency. The mortar shall be proportioned within the limits given in Table 1.

5. Grout

5.1 Grout shall consist of a mixture of cementitious material and aggregate conforming to the requirements specified in Section 2, to which sufficient water has been added to bring the mixture to the desired consistency. The grout shall be proportioned within the limits given in Table 2.

6. Methods of Test

6.1 Compressive strength, air content, and water retention of the mortar shall be determined in accordance with Specification C 91, with the exception that the mortar samples mixed in the laboratory shall be made using the same proportions and the same ingredients that will be used for the mortar in the construction, and at a flow of 130 ± 5 percent.

6.2 The mortar shall conform to the respective physical requirements prescribed in Table 3.

TABLE 1 Mortar Proportions by Volume

Mortar Type	Parts by Volume of Portland Cement or Portland Blast-Furnace Slag Cement	Parts by Volume of Masonry Cement	Parts by Volume of Hydrated Lime or Lime Putty	Fine Aggregate Measured in a Damp, Loose Condition
PM	1	1		2¼ to 3 times the sum of the volumes of the cementitious materials
PL	1		¼ to ½	

TABLE 2 Grout Proportions by Volume

Type	Parts by Volume of Portland Cement or Portland Blast-Furnace Slag Cement	Parts by Volume of Hydrated Lime or Lime Putty	Aggregate, Measured in a Damp, Loose Condition	
			Fine	Coarse
Fine grout	1	0 to 1⁄10	2¼ to 3 times the sum of the volumes of the cementitious materials	
Coarse grout	1	0 to 1⁄10	2¼ to 3 times the sum of the volumes of the cementitious materials	1 to 2 times the sum of the volumes of the cementitious materials

TABLE 3 Physical Requirements of Mortar

Compressive Strength:	
Average of three 2-in. (50.8-mm) cubes, min, psi (MPa)	
7 days[a]	1600 (11.03)
28 days	2500 (17.24)
Water Retention:	
Flow after suction, min, percent of original flow	70
Air Content:	
Volume, max, percent	18

[a] If the mortar fails to meet the 7-day compressive strength requirement, but meets the 28-day compressive strength requirement, it shall be acceptable.

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